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FARM ORGANIZATION AND MANAGEMENT
IN GRAYSON COUNTY

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Fig. 1. Location of the area in which the study was made.

BULLETIN NO. 317

Farm Organization and Management in Grayson County

By W. L. ROUSE, H. W. HAWTHORNE* and Z. L. GALLOWAY

This study was made in the summer of 1929 by the Department of Farm Economics of the Kentucky Agricultural Experiment Station and the Bureau of Agricultural Economics of the United States Department of Agriculture. The purpose was to obtain basic information on the present organization and management of the farms and to determine the factors that control the farmer's income. The study is an attempt to determine how those farmers who made the larger incomes did so. The survey method of collecting the information was used. Records were obtained from 254 operators for the year 1928, but in studying the individual factors affecting profit, only 205 farm records were used. The area was laid out so that the farms are representative for the county.

Since the year studied was extremely wet, it was impossible for the farmers to properly cultivate their crops; hence yields were smaller than in normal years. This naturally had its effect upon the profits. However, this does not invalidate the data for use in comparing farms and systems of farm organization and management, since all were subjected to much the same seasonal handicaps.

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PART 1. INCOME AND OUTGO OF FARM FAMILIES

Business analysis records were obtained from 254 farmers. A cost of living record was secured from 138 of them. For the most part the families included in the study derived their living primarily from farming. A few of them had other lines of business which brought in more than their farms.

Family Living From the Farm

As shown in Table 1, the families used food products from their own farms, worth \$244 per family, wood worth \$28 at farm prices, and house rent worth \$71 when computed at 10 percent of the inventoried value of the house. Other items averaged \$1 per family. These items, aggregating \$344, added to the cash spent for the family living, represented 47 percent of the total.

TABLE 1. Cash Income and Outgo of 138 Farms, Grayson County.

	All Families	Grouped by Operator's Earnings		
		Less than \$500	\$500 to \$999	\$1000 and Over
Number of families	138	85	43	10
Average number in family	4.1	4.1	4.1	4.9
Cash income from:	Dolls.	Dolls.	Dolls.	Dolls.
The farm	857	630	923	2509
Work off the farm	52	25	96	93
Other sources	41	45	34	33
Total cash income	950	700	1053	2635
Cash outgo for:				
Farm expenses	577	527	570	1040
Family living and other purposes	385	354	368	740
Total cash outgo	962	881	935	1780
Income less outgo	-12	-181	118	855
Family living from the farm	344	319	357	501

The amount of family living furnished from the farm not only varied with different families but the groups of families divided on operator's earnings* were on the average also different. The larger income groups used a larger amount of products furnished from the farm.

* See footnote page 174.

The group of ten families with operator's earnings of over \$1,000 received an average of \$501 in family living from the farm and in addition spent an average of \$740 for their living. The group of 43 families with operator's earnings of \$500 to \$999 obtained \$357 in family living from the farm and in addition paid out an average of \$368 for their living. The group of 85 families with operator's earnings of less than \$500 secured \$319 in family living from the farm and spent an average of only \$354 additional for their living.

Income and Outgo

Figures showing the cash income and outgo of 138 families for the year of the study were obtained. The year covered was probably somewhat below normal and for that reason it is likely that the data presented in Table 1 represent income and outgo below the normal for the families included in the study. However, as a basis for showing tendencies and comparing the farms the figures are valid.

Income from Work off the Farm. Work off the farm not directly a part of the farm business was a source of income to 35 of the 138 operators. The total amount received from this source was \$7,231, or an average of \$207 for the 35 operators. The kinds of work off the farm which brought in the greatest amount of money were: hauling, which afforded a total income of \$1,558 to 11 families; carrying mail, which returned \$800 to one family; work on the railroad, which brought in \$750 to one family; carpentry, which furnished one family an income of \$740; various kinds of machine work to five families, which totaled an income of \$670; work on other farms, which furnished fourteen families a total income of \$643; county road work, which provided a total income of \$580 to two families; and lumbering, which furnished a total of \$570 to two families. Other kinds of work off the farm which furnished remuneration to one family each were dealing in coal, work as salesman, plumbing, auto mechanic, and working in timber.

Other Sources of Income. Other sources of income were those which involved little or no effort on the part of the farmer himself. There were 34 different families who received income from these sources. It ranged from \$4 to \$840 and the average received by the 34 families was \$166. These sources were: children at home contributed \$1,745 to eight families; children not at home gave \$444 to two families; boarders brought \$691 to seven families; earnings of two housewives amounted to \$929; a pension brought \$480 to one family; interest on outside investments brought a total of \$741 to six families; rent from other property brought \$260 to one family; and cash gifts received by ten families amounted to \$363. Six of the families had incomes from two of the above sources. On the average about 90 percent of the total cash income of the 138 families came from the farm. The cash outgo both for farm expenses and family living increased as the total cash income increased. The family living furnished from the farm also increased as the total cash income increased.

The total expenditures on the average were \$15 greater than the total cash income per family. Fifty-nine of the group of 85 families whose operator's earnings were less than \$500 failed by \$181 per family to meet expenses. The deficiency ranged from \$6 to \$1,813. Twenty-six, or about 31 percent of these low income families managed to pay expenses and have something left over. This amount varied from \$16 to \$365. In the group of 43 families with operator's earnings ranging from \$500 to \$999 there were 14 families who failed to have incomes large enough to meet their expenses. The amount by which they failed varied from \$9 to \$620. The savings of 29 families in this group who had something left over after expenses were paid ranged from \$6 to \$1,263. Of the ten families in the income group with operator's earnings of \$1,000 or more only one failed to obtain an income larger than the expenses. This family failed by \$272 while the nine families who took in more than they paid had savings varying from \$1 to \$2,811. (See Table 2.)

In the group with operator's earnings of \$500 or less only 1 in 3 had incomes equal to or greater than their expenses. In the group with operator's earnings of \$500 to \$999 two operators out of three took in as much as or more than they paid out. In the group having operator's earnings of more than \$1,000 nine operators out of ten had something left over after paying all expenses.

The families whose cash incomes for the year were not enough to meet their expenses usually made up this deficiency by using savings of previous years or by borrowing. Those families whose cash incomes exceeded their expenditures had money to pay debts, or as savings for future use.

TABLE 2. Amount Available and Amount Spent for Family Living.

	All Families	Less than \$500	\$500 to \$999	\$1000 and Over
Number of families	138	85	43	10
Average number in family	4.1	4.1	4.1	4.9
Income from farms	\$857	\$630	\$923	\$2509
Outgo for farm expenses	577	527	570	1040
Net income from farming	280	103	353	1469
Income for work off farm	52	25	96	93
Income from other sources	41	45	34	33
Amount available for family living	373	173	483	1595
Amount spent for family living	385	354	365	740
Income less outgo	-12	-181	118	855
Family living from the farm	344	319	357	501

PART 2. THE FARM BUSINESS

A detailed business analysis record was obtained from each of 233 farms the major purpose of which was to study the present farm organization and management, to determine the factors which are most important in obtaining larger profits from farming and the relation of these factors to each other.

Status of Operators as to Land Tenure

The percentage of tenancy existing in the area was exceedingly low. Of the 233 farm records only 8 tenants, or less than

4 percent, did not own some land. More than half of these operators were straight land owners. The land that was rented or rented out represented for the most part fields rented on the share rent basis to or from a neighbor for some particular crop. The tenure status of the 233 operators was as follows: 132 were straight owners; 58 were owners and rented some land, of whom 52 rented on the share basis and 6 rented on a cash basis; 32 were owners renting out some land on the share rent basis; three operators both rented and rented out land, all on the share rent basis. Of the eight non-owners seven rented land on the share basis and one rented on a cash basis.

The 233 farms discussed in this bulletin were separated into two groups, A and B. Group A included all farms on which the farm business brought in 75 percent or more of the total receipts. There were 205 farms in this group. Group B included 28 farms on which the non-farming income amounted to more than 25 percent of the total receipts.

A condensed summary comparing the averages of Group A and Group B accompanied by an average of the combined total is found in Table 3. These farms with more than 25 percent outside income were smaller, the acres in crops were less, the numbers of all classes of livestock were fewer, all sources of income from the farm were smaller, and while the family living furnished by the farm was somewhat less the net income was larger. The total capital invested was less and likewise each division of capital, real estate, livestock, machinery, and feed and supplies was less. Both farm receipts and farm expenses were less. The farm receipts failed by \$76 to equal the farm expenses, however, the operator had products furnished by the farm for the family living amounting to an average of \$318. The analysis which follows was confined to the 205 farms of group A, the greater portion of the income of which was derived from the farm business.

Types of Farming

A considerable part of the land in Grayson County is rough and wooded. Approximately three-fourths of the farm

land is tillable. On the average the farms consisted of 135 acres of which 96 acres was tillable. The tillable land consisted of 44 acres of crops, 6 acres idle crop land, 30 acres of rotation pasture, and 16 acres of permanent pasture. The 39 acres of nontillable land was made up of 5 acres in roads and lots, 32 acres in woods, and 2 acres in permanent pasture.

That this is chiefly a livestock area is indicated by the large proportion of the total receipts derived from livestock and livestock products. Approximately 80 percent of the total farm receipts came from livestock enterprises. For the most part the crops grown were feed crops. Of the total receipts, crops accounted for about 14 percent. Table 4 shows the number of farms with receipts from the various enterprises and number of farms with significant receipts from specified enterprises and the position of the enterprises. The crops of major importance in the area were corn, wheat, oats, hay and tobacco.

Corn was the chief feed crop on each of the 205 farms. The acreage in corn was a little more than one-half of the total acreages in crops.

Hay of some kind was produced on 189 of the 205 farms. There was an average of 14 acres of hay per farm, that is, about one-third of the total crop acreage was used for the production of hay. On 110, or more than half of the farms, there was some legume hay cut. Of these, 22 grew clover, 19 grew mixed clover and timothy and 69 grew either soybeans or cowpeas or both. On 167 farms some grass* hay was cut while on 16 farms there was no hay cut.

About one-fourth, or 56 farms, raised some wheat. The acreage of wheat on these farms averaged 11.3 acres. Forty-four farms raised oats with an average of 5.1 acres. Tobacco grown on 49 farms, averaged 1.3 acres for the farms on which that crop was grown.

The livestock of the area, in the order of the number of farms having them, were cattle, poultry, hogs, and sheep. Workstock, either horses or mules, were found on every farm in the study.

* Including timothy, redtop, sorghum for hay, millet and oats for hay.

TABLE 3. Condensed Summary of the Businesses of 233 Grayson County Farms.

Item	All Farms	Group A	Group B
Number of farms	233	205	28
Number in family	4.2	4.2	4.9
Acres per farm	134	137	108
Crop acres	43.1	44	34
Intensive crops (acres)	1	.8	1
Livestock, number ¹			
Work stock	3.3	3.4	2.0
Dairy cows	3.2	3.4	2.0
Other cattle	2.1	2.4	.9
Sheep	7.6	8.2	2.3
Hogs	5.1	5.2	3.9
Chickens, mostly hens	86.1	84.7	60.0
Turkeys	.8	.9	.1
Capital, total	\$4523	\$4692	\$3285
Real estate	3450	3563	2624
Livestock	697	737	406
Machinery	211	233	121
Feed and supplies	165	169	134
Receipts, total	\$897	\$908	\$812
Crops	119	127	55
Livestock and products	674	725	299
Miscellaneous farm receipts	35	35	30
Work off the farm	69	21	428
Expense, total	554	568	444
Current	405	417	319
Unpaid family labor	57	58	53
Livestock (net decrease)	8	7	11
Depreciation	32	35	14
Decrease feed and supplies	52	51	47
Farm income	343	340	368
Labor income	117	105	200
Operator's earnings	447	437	518
Family living, total	330	332	318
Food	236	235	244
Wood	27	28	18
Use of dwelling house	67	69	55
Other	—	—	1

¹ Number at the beginning of the year.

There were cows on 202 of the 205 farms. Thirty-three farmers owned bulls, 53 had heifers, 70 had calves and 25 had some beef cattle. Chickens were also found on 202 of the farms and 38 farmers raised some turkeys. Hogs, including sows, and other hogs were on 132 of the 205 farms. Sixteen farmers kept boars. Sheep were produced on over one-half or 103 of the farms.

Of the 205 farms 99 percent reported sales of poultry, 95 percent sold cattle or dairy products, 73 percent obtained income from hogs, 51 percent sold some sheep and wool.

TABLE 4. Types of Farming on 205 Grayson County Farms.

	Number of Farms with Receipts from	Number of Farms with Significant Receipts from Specified Enterprise and Position of Enterprise						
		Total ¹	1st	2nd	3rd	4th	5th	6th
Poultry	203	157	73	52	25	5	2	...
Cattle	195	160	81	59	14	6	...	...
Hogs	150	96	26	32	32	4	2	...
Sheep	104	55	7	19	19	9	1	...
Tobacco	49	34	8	12	7	7	...	...
Hay	31	10	2	5	3	...	...	...
Corn	19	8	3	2	2	...	1	...
Wheat	25	6	...	1	5	...	...	...
Oats	3	2	...	2	...	...	...	...
Work	43	16	2	3	7	3	...	1
Wood	27	4	1	2	1	...	...	...
Rent	6	3	1	1	1	...	...	...
Truck	25	1	...	...	1	...	...	...
Potatoes	58	1	...	1	...	...	...	...
Fruit	33	2	...	1	...	...	...	1
Horses	1	1	1	...	...	...	...	...
Straw	3	—	—	—	—	—	—	—
Clover seed	1	—	—	—	—	—	—	—
Sorghum syrup	9	—	—	—	—	—	—	—
Corn stover	1	—	—	—	—	—	—	—
Honey	1	—	—	—	—	—	—	—

¹ On the other farms on which these enterprises exist they were of small importance.

Percentages of the farms reporting sales of crops were as follows: Tobacco 24 percent, hay 15 percent, corn 9 percent, wheat 12 percent, oats 1 percent, potatoes 28 percent, fruit 16 percent, truck 12 percent, and straw 1 percent.

Outside work brought income to 21 percent of the farms, wood lot products to 13 percent of the farms and rent to 3 percent of the farms.

Fourteen percent of the total receipts was derived from crops as follows: From tobacco 5 percent, corn 4 percent, hay 2 percent, wheat 1 percent, oats, sorghum syrup, potatoes, garden products, orchard, and other products made up the remaining 2 percent.

The receipts from livestock which amounted to 80 percent of the total included all classes of livestock and livestock products. The various enterprises contributed to the total receipts as follows: Cattle and dairy products 34 percent,

poultry and eggs 18 percent, hogs 15 percent, sheep and wool 10 percent, turkeys 2 percent, and horses and mules 1 percent.

The remaining 6 percent of the total receipts was made up of increase in feed inventories, work off the farm by the operators, sale of wood lot products and money received from rent.

Some Farmers Make More Money Than Others

That some farmers made more money than others was as true of Grayson county as of other localities in Kentucky. One measure of income is total receipts from the farm during the year including the net increases in the inventory and the work of the operator off the farm. The receipts ranged from \$13 for the lowest to \$5,584 for the highest. Seventy-three had total receipts of less than \$500. Of these thirty-seven were less than \$300 and six were less than \$100. Sixty-seven farms had receipts ranging from \$500 to \$999, fifty-three farms had receipts ranging from \$1,000 to \$1,999, six farms ranged from \$2,000 to \$2,999 and only six farms had total receipts of over \$3,000.

A second income figure is "farm income", a figure representing what the operator has left after deducting from the total receipts the total farm expenses including the unpaid family labor other than that of the operator. The farm income on these 205 farms ranged from minus \$543 to \$3,523. Of these, 147 farms had a farm income of less than \$500. On 36 farms the receipts were inadequate to meet expenses thus leaving a minus farm income. However, 58 farms obtained a farm income of more than \$500 and of these 16 secured more than \$1,000.

"Labor income", that which is left after deducting the interest on the farm investment from the farm income, ranged from minus \$771 to \$2,862 for the 205 farms. Of the 205 farms 118 had labor incomes of less than \$100. Of these 90 were minus incomes. Only 27 farmers secured labor incomes of more than \$500, and only four had labor incomes of \$1,000 or more.

Another measure of net income is operator's earnings* which represents the labor income plus the value of the food

* In the analysis of the farm business set forth in this bulletin, the calculations are on the farm basis, that is, as if the operator was the sole owner of all capital involved.

products, fuel, use of the farm house, and other items which the farm furnished to the family living. Table 5 shows the marked way in which the operator's earnings of these farmers varied, the farms being grouped by number of crop acres. On 133 of the 205 farms the operator's earnings were less than \$500, on 56 farms the operator's earnings ranged from \$500 to \$999 while on 16 farms the operator's earnings amounted to \$1,000 or more. A further study of the table shows that a greater percentage of the larger farms showed superior incomes than did the small farms.

TABLE 5. Variation in the Operator's Earnings on 205 Grayson County Farms—Farms Grouped by Number of Crop Acres.

No. of Crop Acres Per Farm	Number of Farms	Grouped on Operator's Earnings		
		Number Less than \$500	Number from \$500 to \$999	Number \$1000 and Over
20 or less	26	23	3	—
21 to 40	76	53	16	2
41 to 60	53	29	18	6
61 to 80	29	12	13	4
Over 80	21	11	6	4
Total	205	133	56	16

Why Some Farmers Made More Money Than Others

A condensed summary dividing these farms into three groups as to income, based upon operator's earnings, is shown in Table 6.* When this table is studied in detail and comparisons made of the three income groups it is found that on the average the group with the highest operator's earnings is also highest in total receipts, farm income, and labor income.

Operator's earnings were found to be the best income measure since the products furnished by the farm for the family living are a relatively large portion of the total farm production.

The farms in the groups with the highest operator's earnings on the average excelled those in the other groups in size of business, quality of business and labor efficiency.

* For a detailed summary divided on the same basis see Table 21 in the Appendix.

The more profitable farms had more cows, sheep, hogs, chickens and turkeys.

The quality of business was better on the more profitable farms as indicated by the larger crop yields and the larger production of livestock.

TABLE 6. Some of the More Important Factors Affecting Farm Profits.

	All Farms	Grouped on Operator's Earnings		
		Less than \$500	\$500 to \$999	\$1000 and Over
Size				
No. of farms	205	133	56	16
No. in family	4.2	4.0	4.4	4.8
Size of farm, acres	137	126	143	216
Acres in crops	44	39	51	68
Acres in tobacco	.3	.3	.5	.9
Livestock				
Workstock	3.4	3.2	3.6	4.3
Cows	3.4	2.6	4.0	7.3
Sheep	8.2	5.7	16.5	18.1
Hogs	5.2	3.6	6.1	16.1
Chickens	84.7	75.5	90.0	142.0
Capital	\$4692	\$3909	\$5401	\$8720
Real estate	3563	3054	4046	6092
Working capital	1129	855	1355	2628
Percent working capital is of total capital	24	22	25	30
Receipts	\$908	\$613	\$1180	\$2408
Expenses	568	513	568	1032
Farm income	340	100	612	1376
Labor income	105	—95	342	940
Operator's earnings	437	203	715	1407
Percent expenses are of total receipts	62.6	83.9	48.1	42.9
Receipts per crop acre	\$20.64	\$15.72	\$23.14	\$35.41
Quality				
Corn yield, bus.	14	11	17	20
Hay yield, tons	.8	.8	.9	1.0
Labor efficiency				
Acres of crops per man	32.6	29.8	38.3	38.2
Man work units per man	177.7	157.3	212.0	250.6
Acres of crops per horse	12.9	12.2	14.2	15.8
Horse work units per horse	45.0	40.9	48.9	65.0

The more profitable farms showed greater labor efficiency as measured by the acres of crops and man work units per man, acres of crops per horse and horse work units per horse. These and other factors affecting the farm profits are discussed in more detail later in this bulletin.

Capital Investment

The total capital investment averaged \$4,692 per farm. The operators who had operator's earnings of less than \$500 had an average investment of \$3,909, those with operator's earnings ranging from \$500 to \$999 had an average investment of \$5,401 while those with operator's earnings of more than \$1,000 had an average investment of \$8,720.

Of the total investment there was on the average 76 percent invested in real estate and 24 percent in working capital. Of the working capital livestock accounted for 16 percent, machinery 5 percent, and feed 3 percent. The group of farms with the highest operator's earnings had on the average a smaller percent of their capital invested in real estate and a larger percent in working capital than did either of the groups with lower operator's earnings. For a more detailed analysis of the capital see Table 21 in the appendix.

The Size of Business

The size of business is usually an important factor in determining the net income of a farm operator. A business of good size affords a better chance for making good profits than does a small business. However, a large business when conducted inefficiently will show a larger loss than a small business when conducted inefficiently. There are several ways of measuring the size of a farm business. The most important of these measures are the number of acres of land, acres of crops, total capital investment, the numbers of livestock, amount of labor required and the number of work stock. The figures of this study indicate that the highest income farms had a larger farm business than the lower income farms.

In Table 7 the farms are divided into five groups according to the number of acres in crops. It will be noted that on the average about one-half of the farms are above the average in the number of acres in crops. The percentage of the land in crops is larger on the larger farms.

Measured by acreage, corn was the most important crop. It was found that the farms with the smaller acreages of crops

TABLE 7. Utilization of Land on 205 Grayson County Farms of Various Crop Acreages.

Item	All Farms	Grouped on Acres in Crops				
		20 and Less Acres	21-40 Acres	41-60 Acres	61-80 Acres	Over 80 Acres
Number of farms	205	26	76	53	29	21
Acres per farm	137	74	105	137	194	253
Owned	127	71	100	129	172	232
Rented	10	3	5	8	22	21
Rented out	2	1	1	1	7	8
Operated	135	73	104	136	187	245
Roads, lots, bldgs., etc.	5.1	3	4	7	6	6.4
Woods pastured	11.3	4	10	13	22	8.0
Woods not pastured	20	18	16	18	23	30.4
Other pasture not tillable	2.1	1	1	3	3	4.8
Permanent pasture tillable	16	12	14	10	25	32.4
Rotation pasture	30	16	25	31	34	54.4
Idle crop land	6	4	4	7	6	6.2
Crops	44	15	30	47	63	102.4
Corn	22.2	11.1	17.4	24.2	27.2	41.5
Wheat	3.1	.2	1.0	3.4	6.3	9.8
Oats for grain	1.5	.1	.5	2.0	3.4	4.4
Rye	*	---	---	---	---	---
Corn silage	.8	.1	.1	.2	.3	.7
Hay						
Clover	.7	.3	.5	.4	1.0	2.8
Mixed clover and timothy	1.2	.2	.4	.9	3.5	3.3
Grass	8.0	1.4	6.0	8.8	13.9	14.0
Millet	.3	.1	.3	.4	.4	1.0
Oat hay	1.1	*	.7	1.3	.8	4.4
Soybean and cowpea	2.4	.3	1.3	2.5	2.6	8.5
Sorghum for hay	.3	.1	.1	.2	.3	1.6
Sorghum for syrup	*	*	*	.1	*	.2
Tobacco	.3	.1	.3	.5	.4	1.2
Potatoes	*	*	*	*	.1	*
Truck crops	*	---	---	.1	---	---
Orchard	1.1	.4	.9	1.2	2.1	2.1
Garden	.5	.6	.5	.6	.6	.6
Other crops	*	---	---	.2	---	---
Man work units	240	128	188	233	307	485
Horse work units	153	63	111	167	199	325

* Indicates an average of less than .1.

had a larger percentage of crop land in corn than did the farms with the larger crop acreages. On the average corn occupied about one-half of the crop land.

That the larger farms had on the average a relatively larger acreage of hay accounts in a considerable measure for the fact that this group of farms had a larger percentage of their land in crops. Thus while the group of farms with more than 80 acres in crops had about seven times as many acres in crops as did the group with 20 acres and less in crops, the acreage of

hay was about fifteen times as great. The average acreage devoted to the production of tobacco, wheat, oats for grain, corn silage was greater in the groups with the larger number of crop acres.

That a larger proportion of the land on the smaller farms was in woodland partially explains why the smaller farms had a smaller percentage of their land in crops. Only part of this woodland was pastured or even fenced so that it might be pastured. The average percentage of waste land was greater on the farms with the smaller crop acreages.

The average number of productive work units* both for men and horses was greater for the groups of farms having the larger acreages of crops.

TABLE 8. Comparison of Size Factors of 205 Grayson County Farms Grouped by Operator's Earnings.

Item	All Farms	Grouped on Operator's Earnings		
		Less than \$500	\$500 to \$999	\$1000 and Over
Number of farms	205	133	56	16
Acres per farm	137	126	143	210
Acres in crops	44	39	51	68
Receipts per acre of crops	\$21	\$16	\$23	\$35
Acres in tobacco	3.3	.3	.5	.9
Number of cows	3.4	2.6	4.0	7.3
Number of ewes	7.7	5.3	15.9	17.3
Number of sows	1.0	.8	1.3	2.4
Number of chickens	85	76	90	142
Number of turkeys	.9	.5	1.1	3.8
Man work units	236	203	281	423
Man work units per man	177.7	157.3	212.0	250.6
Horse work units	148	127	177	250
Horse work units per horse	45.0	40.9	48.9	65.0
Man equivalent	1.4	1.3	1.3	1.8
Number of work stock	3.4	3.2	3.6	4.3

Table 8 shows the comparison of the size of 205 Grayson County farms when grouped by operator's earnings. The figures in the above table show that the farms having operator's earnings below \$500 (133 in number) were below the average in all the measures of size. The farms which obtained between \$500 and \$999 as operator's earnings (56 in number) were somewhat above the average in all the size measures. The farms

* A productive work unit is approximately the equivalent of a day's work of ten hours.

which secured operator's earnings of \$1,000 or over (16 in number) were considerably above the average in all the measures of size of business. This however does not mean that size of business guarantees a comparatively large income. That a large business is sometimes inferior in some of the other factors of success may cause a comparatively low income. This study indicates that the business of many Grayson County farms is entirely too small to pay the operator a fair wage for his work.

This being the case the question naturally arises how may the small farmer increase the size of his business. In general there are two ways by which the size of business may be increased. One is the buying or renting more land and the other is greater intensity on the present farm. In Grayson County most of the farms, the business on which was too small, could enlarge their business without acquiring more land. Possibly the best way to increase the size of business on Grayson County farms which are too small is to increase the amount of livestock. The figures seem to indicate that many farms were too lightly stocked for the largest profits.

Livestock which require large amounts of grain did not seem to be needed in the area. For the most part the increase should come by the addition of livestock which could utilize the rough feeds and grass to advantage. Although this is primarily a livestock area and 80 percent of the receipts were derived from the sale of livestock and livestock products, good crop yields were highly important for the feed crops produced. On many of the farms low crop yields were directly or indirectly responsible for low profits. On the low yielding land it was usually found that the fertility had been depleted by the cropping systems in use.

To remedy this an effective program of soil improvement is needed. The use of limestone and phosphate, manure, and the control of erosion would be the chief factors in such a program. A good rotation including a legume would be very essential. On practically all of these farms there was some good tillable land as well as some rougher land which should not be tilled. On the more tillable land the regular crop rotation

should be practiced. On the rougher land a cropping system should be used which includes a cultivated crop only when the land needs reseeding for pasture.

For best net returns in an area such as this it is usually found that livestock which utilizes grass and roughage are needed. This would necessitate a pasture program which would furnish grazing for as long a period as possible. Such a program would tend to increase the carrying capacity of the pastures as well.

Farm Receipts

The receipts of the 205 farms grouped by operator's earnings are shown in Table 6. The receipts averaged \$908 per farm. There was a wide variation in receipts. Seventy-three of the farms had receipts of less than \$500 and one-half of the 73 farms less than \$300. Sixty-seven farms had receipts ranging from \$500 to \$999; 53 had receipts ranging from \$1,000 to \$1,999; 12 had receipts greater than \$2,000. Six of these twelve had receipts exceeding \$3,000.

Approximately 80 percent of the total receipts came from livestock, 14 percent from crops, 3 percent from increase in feed and 3 percent from outside work. For each \$100 of receipts an average of \$62 was paid out as expenses.

Perquisites Furnished by the Farm to the Family Living

The study showed the great importance of the perquisites furnished by the farm to the family living. The value of these farm privileges averaged \$332 per family and nearly equaled the sum of the net cash income for the farmer's labor and management and the income on his investment. On the smaller farms the value of the family living from the farm was three times as great as the net cash income. These farms were much more significant in furnishing subsistence directly to the farm family than in producing things to be sold. The study indicates that the well-being of families in the region is dependent in a very large measure upon their producing an ample supply of

foods for home use, particularly vegetables, fruits, dairy and poultry products.

The value of the family living furnished by the farm averaged \$332 for the 205 farms. Of this amount food constituted \$235, fuel \$28 and the use of the family residence \$69. The amounts and values of the various items are shown in Table 21 in the appendix. Those operators with operator's earnings of less than \$500 had items valued at \$298, on the average, furnished by the farm for their living. Those with operator's earnings ranging from \$500 to \$999 had an average of \$373 in products furnished the home, and those with operator's earnings amounting to \$1,000 and over got from the farm products valued on the average at \$467.

Expenses

The total average expenses for the 205 farms amounted to \$568, of which current expenses constituted approximately 73 percent. The other important expense items and the percentage of the total expenses which these items represent are, unpaid family labor 10 percent, decrease in feed inventories 9 percent, and depreciation of machinery, dwelling and other buildings 7 percent.

The largest items of the current expenses were, feed bought which averaged 25 percent of the total expenses, hired labor 10 percent, seeds and fertilizers 12 percent, insurance and taxes 10 percent. In the three income groups the current expenses differ but little as to their percentage of the total expenses. On the farms of lowest income group a larger percentage of total expenses went for feed, insurance and taxes than on the highest income group. The percent of decrease in feed inventories, decrease in livestock inventories and the percent of unpaid family labor was also greater on the farms in the lowest income group. In the highest income group a larger percentage of total expenditure went for the purchase of seeds, fertilizer, fuel and oil for farm work, and a much larger percentage for the purchase of lime.

The average purchase of feed amounted to about \$16 for each \$100 of receipts. On the average the lowest income group purchased feed amounting to \$22 for each \$100 of receipts, while the highest income group spent \$9 for feed for each \$100 in receipts. Apparently the reason for this difference is that the better farmers produced feed crops which enabled them to avoid heavy expenditures for purchased feeds.

Crop Yields and Their Relation to Income

The analysis shows that another important factor influencing profits is crop yields. The group of farms with the highest operator's earnings produced 20 bushels of corn per acre as compared with 11 bushels on the lowest income farms; 7 bushels of wheat compared with 4 bushels; 22 bushels of oats compared with 18 bushels; 1 ton of hay compared with .8 tons; and 956 pounds of tobacco compared with 507 pounds. As a rule the farms which had the higher yields of the major feed and cash crops obtained the larger incomes. (See Table 9.)

TABLE 9. Crop Yields Per Acre and Their Relation to Operator's Earnings on 205 Grayson County Farms.

Crops	All Farms	Grouped on Operator's Earnings		
		Less than \$500	\$500 to \$999	\$1000 and Over
Number of farms	205	133	56	16
Corn, bus.	14	11	17	20
Wheat, bus.	5	4	6	7
Oats, bus.	18	18	15	21
All hay, tons	.8	.8	.9	1.0
Legume hay, tons	1.0	1.0	1.1	1.1
Tobacco, lbs.	652	507	685	956

Corn occupied more than one-half of the crop land on the 205 farms. Since corn was the chief grain used for feed the farms were sorted into groups based upon the yield of corn per acre. On the farms on which the corn yield was less than ten bushels per acre the operator's earnings averaged \$252. On the farms obtaining a yield between ten and twenty bushels per acre operator's earnings averaged \$478. On the farms with yields

between twenty and thirty bushels per acre the average operator's earnings were \$670. The group of farms having yields of thirty bushels or more per acre secured operator's earnings which averaged \$785. (See Table 10.)

Table 10. Relation of the Yield of Corn to Labor Incomes and Operator's Earnings on 205 Grayson County Farms.

Yield of Corn (Bushels Per Acre)	Number of Farms	Labor Income	Operator's Earnings
Less than 10 bus.	92	—\$41	\$265
10 to 19.9	57	131	478
20 to 29.9	46	294	670
30 or more	10	419	785
Total	205	105	436

The average yield of hay was not only larger on the high income farms than on the low income farms, but the type of hay was better. There was also a larger acreage of hay and a larger percentage of legume hay. Here it is important to note that in each group the yield of the legume hay was greater than that of any of the other kinds of hay. That the total acreage and quality of hay was greater, that there was a larger percentage of legume yielding more per acre than other hay crops appear to be important facts accounting for the larger profits of the farms in the higher income groups.

Tobacco, the most important cash crop grown in the area, was produced on about one-fourth of the farms included in this study. The yield of tobacco was considerably higher on the farms with the higher incomes than on those with the lower incomes.

The effect of crop yields on the income of these farms is worthy of further consideration. The crops are primarily feed crops with the exception of tobacco. The crop sales came from surpluses of feed crops and from tobacco. The importance of good yields is as great in a livestock section as in an area where all the crops are cash crops. The items entering into the cost of production of the various crops with the exception of the harvesting cost do not increase directly as the yield per acre

increases. Experimental data and the experience of successful farmers indicate that land properly handled will not only produce better than average yields but will furnish more abundant and better pasture, thereby making it practicable for farmers to handle more units of productive livestock on a given acreage.

One operator in the area was able, by the use of lime, phosphate, manure and a rotation which included a legume, to produce as much corn on his farm as his neighbors had been able to produce on three times as much land thru inferior practices.

Livestock Production and its Relation to Income

Approximately 80 percent of the total receipts were derived from livestock and livestock products. With this in mind it is important to note what effect various degrees of production of livestock enterprises had upon the income from the farms.

Since cattle and dairy products were the major source of receipts on a greater number of farms than any other enterprise, that enterprise is considered first. The receipts per cow on all the farms averaged \$91. On the farms which fell in the group with highest operator's earnings the receipts per cow averaged \$116 whereas on the farms in the group with lowest operator's earnings the average receipts per cow amounted to \$82. When dairy products furnished the home are included the total production per cow on all farms averaged \$109. The total production per cow in the group with highest operator's earnings amounted to \$126 whereas the farms in the group with lowest operator's earnings the production per cow amounted to \$105. The variation may be accounted for by several factors, namely: superior cows, good feeding and careful attention, and that more calves were raised and marketed as heifers or steers.

That the quality of livestock affected the income is again indicated by a study of the 205 farms after they had been grouped according to income per cow. As shown in Table 11, on the average the farms having larger incomes per cow had larger percentages of total receipts derived from cattle. The income per cow showed a marked effect upon the labor income and

operator's earnings. Of course not all the farms that showed good returns per cow showed good returns in other enterprises on the farm, so did not fall in the high income groups.

TABLE 11. Relation of Returns Per Cow to Income on 205 Grayson County Farms.

Returns Per Cow	Number of Farms	Labor Income	Operator's Earnings
Less than \$50	29	—\$62	\$238
\$50 to \$99.99	99	97	421
\$100 to \$149.99	53	135	474
\$150 and over	24	275	661
Total	205	105	437

Poultry. Poultry was the enterprise second in importance on the farms studied; 18 percent of the total receipts were derived from poultry. Twenty-three percent of the total live-stock receipts were obtained from that enterprise. While many of the low-income farms depended largely upon poultry and had few enterprises, the larger-income farms had, on an average, more hens per farm.

To determine the relation of poultry to net income the farms were grouped according to income per hen both as to eggs and meat. The size of flock seemed to have little or no effect upon the income per hen. The largest flock was found in the second lowest group as to income per hen while the second largest flock was the highest in income. There was a positive tendency for the groups which obtained on the average better than \$2.50 per hen from eggs and meat to have larger incomes. See Table 12.

Turkeys were found on 36 of the 205 farms and on these farms were shown to be one of the most profitable enterprises. The average income per turkey hen was about \$30.

Hogs. Altho the number of hogs in this county has decreased in recent years, the percentage of total receipts derived from this enterprise is significant. Hogs totaled about 14 percent of the receipts on the 205 farms and in addition furnished pork to the home valued at \$49. The percentage of total receipts derived from the sale of hogs was approximately 14 percent on the 133 farms with operator's earnings less than

\$500, and about 17 percent for the farms with operator's earnings of more than \$1,000. On the average the operators deriving the larger incomes per sow obtained larger net earnings than those deriving smaller incomes per sow.

TABLE 12. Relation of Returns Per Hen to Incomes on 205 Grayson County Farms.

Returns Per Hen	Number of Farms	Labor Income	Operator's Earnings
Less than \$1.00	9	—\$93	\$102
\$1.00 to \$1.99	68	22	320
\$2.00 to \$2.99	85	123	488
\$3.00 and over	43	244	590
Total	205	105	437

Sheep. On about half of the farms there were some sheep. Most of the flocks were small. The income per ewe varied from minus \$5 to more than \$15. A study of the farms grouped by operator's earnings shows that the returns per ewe were greater on the largest income farms while the percentage of total income obtained from sheep was about the same.

A further study of the records grouped on income per ewe shows that the group with the lowest average income per ewe had flocks which were on the average about the same size as those in the group of farms which had the highest average income per ewe. The average income per ewe was \$9.56. About half the operators fell below this average. Since sheep are good scavengers much of the production of these small flocks was obtained from feed which probably would not have been utilized by any other class of livestock.

The foregoing material which deals with the individual classes of livestock demonstrates the effect of variation in production upon income and profits. However, it is important that these enterprises be considered from the standpoint of a farm unit which returns the greatest total profit. Thus for an operator to obtain a good profit from his farm business it is necessary as a rule that his accomplishment be above the average in more than one of the enterprises undertaken on his farm.

Efficiency of Labor

The analysis of the records of these 205 farms showed that the labor accomplishment per man had an important influence on profits. For each farm the total accomplishment in acres of crops produced, livestock cared for and outside work done by the operator was calculated in terms of "productive work units", a unit being approximately the equivalent of a day's work of ten hours. The number of days work per man for each farm was computed by dividing the total work units on any farm by the "man equivalent"* stated in terms of months of labor of one man during the year. The average number of productive work units for the 205 farms was 178 per man. The group with the lowest operator's earnings averaged 157 productive work units per man whereas the group with the highest operator's earnings averaged 251 units per man. This greater efficiency of labor was to a considerable extent due to a larger business and a consequent better distribution of labor on the farms of the more successful operators. (See Table 8.) These larger farms provided a business of sufficient scope to more nearly give a full year of productive employment.

A program which makes possible the most efficient use of labor is one with sufficient crops and livestock of the kinds and proportions which distribute the labor evenly, thru the year. However, so much time may be spent on low-income crops and poor livestock that failure to produce a good income results, regardless of the number of productive work units.

A further study of the records shows that on many farms the labor accomplishment per man was very low. There is good evidence that this was largely because of too small a business. Altho the farms were only family units the business should have been of such size as to show a high labor accomplishment per man. The crops produced and the livestock kept should have so utilized and distributed the labor that the operator and his family should have accomplished at least 250 productive work units per man.

* The total period for the operator, the actual time worked by family labor and hired labor.

Horse Work

The number of work stock necessary to successfully operate a farm varied from farm to farm in the same area. An important factor was the efficiency with which the horse power was utilized. The average number of horses and mules on the 205 farms was 3.4 head. The number on the farms of the low income operators averaged 3.2 head per farm. The number on the farms of the high-income operators averaged 4.3 per farm. The productive work units accomplished per horse averaged 45 for the 205 farms. On the low-income farms the productive horse work units per horse averaged 41, while on the high-income farms the productive work units per horse averaged 65.

Since many of the farmers did not have automobiles and those who did could not use them during a considerable part of the year because of bad roads, it was necessary that horses be available for road transportation. Many of the children used horses to go back and forth to school. Horses so used could not be classed as strictly driving horses since they were also used for farm work. This probably accounts in a large measure for low productive work units and, too, this accounted for a part of the difference in the productive work units in the various group of farms.

Quite probably the business on these farms could have been expanded considerably in size without an increase in the number of work stock required.

Family Living From the Farm

On the 205 farms the average family living from the farm when valued at farm prices amounted to \$332. If these items had been valued at retail price the amount would probably have been doubled. The part furnished represented more than 50 percent of the total family living. Food valued at \$235, wood at \$28 and house rent at \$69, when estimated at 10 percent of the value of the house, made up the total value of the perquisites.

The importance of items provided by the farm for the family living cannot be too highly emphasized. They equaled

in value more than 3 times the average labor income and almost equaled the entire farm income. The value of the family living from the farm varied on the various farms as did the labor income yet it was found that on the farms which yielded the larger profits the value of the perquisites was greater.

In planning the year's business in the area it is highly important that farmers plan for producing those things that can be used by the family. In so doing the cash outlay necessary for the family living can be materially reduced.

Roads

One of the things needed thruout the county is better roads. Improvement of the roads would make possible in some sections a shift in the type of farming. Also, it would make possible the hauling of limestone to farms which cannot be done now because of the excessive expense. In their present condition it is almost impossible to haul loads over the roads during the period of the year when farmers have the time for such work.

Variation of Farm Incomes as Affected by the Predominance of Important Factors

Farm profits very rarely depend upon any one factor alone but usually upon a combination of factors. The data in Table 13 point to the direction which farmers in this area should go in order to obtain larger net returns. The 10 factors used in the table and the average for each of the factors for the 205 farms are as follows:

Crop acreage	44.0	acres
Acres in tobacco	.5	acres
Number of cows	3.4	head
Number of hens.....	85.0	head
Receipts per cow	98	dollars
Receipts per hen	2.39	dollars
Crop acres per man	32.6	acres
Crop acres per horse	12.9	acres
Yield of corn	14.0	bushels
Receipts per \$1 expense	1.60	dollars

Thirteen of the 205 farms were not above the average in any one of the factors. These showed very low net returns, their operators showing minus farm incomes, minus labor incomes and operator's earnings which averaged only \$63. Thirty-one farms were above the average in 4 factors and showed operator's earnings of \$411. Thirteen farms were above the average in 8 factors and these showed operator's earnings averaging \$1,322. There were no farms above the average in more than 8 of the 10 factors.

TABLE 13. Variation in Farmer's Profits as Affected by Farms Being Above or Below the Average in Important Factors.

Factors Above Average	Farms	Receipts	Farm Income	Labor Income	Operator's Earnings
No.	No.	Dolls.	Dolls.	Dolls.	Dolls.
0	13	210	—60	—157	63
1	23	362	16	—126	149
2	22	385	110	—37	218
3	34	597	164	3	290
4	31	727	304	114	411
5	21	903	335	63	416
6	31	1624	562	146	615
7	17	1563	669	373	754
8	13	2146	1281	871	1322
9	—	—	—	—	—
10	—	—	—	—	—
Average	205	908	339	104	436

PART 3. SUGGESTED SYSTEMS OF FARMING

It was pointed out in the preceding discussion that the low returns realized from farms in the area were the result of poor selection and proportioning of crops and livestock as well as unprofitable practices in crop and livestock production. These weaknesses have resulted in a very small income on many farms. Because of the small volume of sales and the margin of profit commonly received by farmers, the net return per farm was very small.

This study indicates that in order to secure more adequate returns, certain readjustments should be made. Two general types of changes are suggested in Part 2. The first includes changes in the kinds and acreages of crops grown and in the

kinds and number of livestock maintained. More specifically, it was pointed out that more feed crops, especially legume hay and pasture, should be grown and that more roughage consuming livestock such as cattle and sheep should be kept.

The second type of change suggested deals with methods and practices. The importance of improved practices in the production of crops has been pointed out. These included (1) the more general use of limestone and phosphate in the rotation, (2) fuller use of manures, (3) control of erosion, and (4) improved rotations which include more legumes for hay and pasture. Better feeding and breeding in the production of livestock and livestock products were also emphasized as a means of securing larger production per unit of livestock kept.

This section of the bulletin shows how the foregoing suggestions may be used in adjusting the organization and operation of representative farms in the area so that larger returns will result. It is also intended to present the details of the suggested organizations in such a way that farmers can follow the calculations step by step and, if they desire, adjust the figures to conform to conditions on their own farms. The budgets for the suggested systems show the approximate net returns which reasonably may be expected. These systems were worked out in such a way as to make the best possible use of the land, labor, power, equipment, and operating capital available. Crop and livestock enterprises were selected and proportioned with this in view.

Farmers in the area who are carefully selecting and balancing the crop and livestock enterprises and following good methods and practices are securing returns which are equal to or larger than those shown for the suggested systems.

Production Requirements, Production, and Assumed Relative Prices

Crop yields per acre, livestock production per head, and the requirements to produce a unit of crop or livestock products vary greatly from year to year. Likewise, the prices received for products also vary. However, in order to balance crop and livestock production and to make comparisons of the net returns

to be expected it is necessary that adequate and reliable data relative to crop and livestock requirements, yields, production

TABLE 14. Expected Normal Production Requirements for Crops and Yields (Acre Basis).

Crop	Requirements		Yields
	Kind	Amount	
Corn cut by hand and husked from shock	Seed, lbs.	7	40 bus. grain 2200 lbs. stover
	Superphosphate, lbs. ¹	200	
	Twine, lbs.	1	
Corn silage	Seed, lbs.	8	7 tons
	Superphosphate, lbs. ¹	200	
	Filling costs, dolls. ²	3.50	
Soybean hay	Seed, bus.	2	4000 lbs.
	Superphosphate, lbs.	100	
Mixed clover hay	Limestone, tons	2	3000 lbs.
	Seed:		
	Red clover, lbs.	4	
	Alfalfa, lbs.	4	
	Orchard grass, lbs.	5	
	Lespedeza, lbs.	3	
Wheat	Superphosphate, lbs.	300	16 bus. grain 1200 lbs. straw
	Seed, bus.	1¼	
	Twine, lbs.	3	
	Threshing (contract), dolls. ³	1.60	
Tobacco (Burley)	Nitrate of soda, lbs.	200	1000 lbs.
	Superphosphate 16%, lbs.	500	
	Wood for plant beds, lds.	3	
	Canvas, yds. ⁴	50	
	Arsenate of lead, lbs.	4	
Cucumbers	Seed, lbs.	1	5000 lbs.
	Beetle dust, lbs.	40	
	Superphosphate 16%, lbs.	400	
	Nitrate of soda, lbs.	100	
Oats for grain (spring)	Superphosphate, lbs.	300	25 bus. grain 1000 lbs. straw
	Seed (Burt), bus.	1	
	Twine, lbs.	3	
	Threshing, dolls.	1.25	
Rye (cover crop)	Seed, bus.	1½	
Pasture mixture ⁵	Limestone, tons	2 ⁶	
	Seed:		
	Lespedeza, lbs.	3	
	Orchard grass, lbs.	7	
	Redtop, lbs.	3	
	Sweet clover, lbs.	10 ⁷	

¹ Most profitable returns from the use of superphosphate are obtained on limed soil.

² For power, cutter, and two men.

³ For power, machine and two men, 10 cents per bushel.

⁴ Good quality canvas usually lasts 3 years and one-third the amount shown is bought each year.

⁵ For unlimed ground omit sweet clover seed from this mixture and add one pound of white clover.

⁶ Will be necessary once in 6 to 8 years as the land is prepared for reseeding.

⁷ Unhulled seed.

and prices which might reasonably be expected should be available.

Production requirements and yields which may normally be expected to prevail for crops commonly grown in the area are shown in Table 14. These expected requirements and yields were based upon data obtained on farms in the area, upon

TABLE 15. Expected Normal Production Requirements for Livestock and Production Per Year (Head Basis).

	Production Requirements			Production	
		Com- bina- tion 1 ¹	Com- bina- tion 2 ¹	Kind	Amount
Dairy cows	Corn, bus.	14	17	Whole milk, lbs.	5000
	Bran, lbs.	400	100	or	
	Cottonseed meal, lbs.	200	250	Butterfat, lbs.	225
	Legume hay, lbs.	2500	2500	Skim milk, lbs.	4400
	Corn stover, lbs.	2000	2000		
	Pasture, acres	2	2		
	Miscellaneous, dolls.	2.00	2.00		
Dairy cows	Corn, bus.	18	18	Whole milk, lbs.	7000
	Bran, lbs.	500	500	(3.7%)	
	Cottonseed meal, lbs.	250	250		
	Legume hay, lbs.	3500	4500		
	Corn stover, lbs.	1000	2000		
	Silage, lbs.	4000			
	Pasture, acres	2	2		
	Miscellaneous, dolls.	2.00	2.00		
Veal calves	Whole milk, lbs.	500		Veal, lbs.	150
Dairy calves (Birth to 1 year of age)	Corn, bus.	2			
	Bran, lbs.	100			
	Skim milk, lbs.		1200		
	Whole milk, lbs.	500	50		
	Legume hay, lbs.	200	200		
	Pasture, acres	$\frac{1}{2}$			
	Miscellaneous, dolls.	.10	.10		
Dairy heifers ² (1 to 2 years of age)	Corn, bus.	4	4		
	Bran, lbs.	100	100		
	Legume hay, lbs.	1000	500		
	Silage, lbs.		1500		
	Pasture, acres	$1\frac{1}{2}$	$1\frac{1}{2}$		
	Miscellaneous, dolls.	.20	.20		
Beef cows	Corn, bus.	18	12	Butterfat, lbs.	50
	Bran, lbs.		200	Skim milk, lbs.	1000
	Cottonseed meal, lbs.	175	150	Cull cow, lbs. ³	160
	Legume hay, lbs.	2200	1500	Calif, lbs.	410
	Corn stover, lbs.	3000	3000		
	Corn silage, lbs.		4000		
	Pasture, acres	2	2		
	Miscellaneous, dolls.	2.50			
Beef heifers (1 to 2 years of age)	Corn, bus.	4	5		
	Legume hay, lbs.	1500	1000		
	Corn stover, lbs.		1000		
	Pasture, acres	$1\frac{1}{2}$	$1\frac{1}{2}$		
	Miscellaneous, dolls.	.20	.20		

TABLE 15. Expected Normal Production Requirements for Livestock and Production Per Year (Head Basis)—Continued.

	Production Requirements				Production	
		Com. bina- tion 1 ¹	Com. bina- tion 2 ¹	Com. bina- tion 3 ¹	Kind	Amount
Sheep, per mature head	Corn, bus.	1.5	1.12	.5	Lambs, lbs.	80
	Oats, bus.		.75	.75	Cull ewes, lbs.	15
	Bran and short, lbs.			24	Wool, lbs.	7
	Linseed meal, lbs.	2.5		8		
	Silage, lbs.			400		
	Legume hay, lbs.	325	325	200		
	Pasture, acres	.4	.4	.4		
	Miscellaneous, dolls.	.02	.02	.02		
Hogs per 100 lbs. live weight produced	Corn, bus.	5	6.5	7	Pork, live weight, lbs.	100
	Tankage, lbs.	20		20		
	Shorts, lbs.	80				
	Skim milk, lbs.		275			
	Pasture, acres	.1	.1	.1		
	Miscellaneous, dolls.	.15 ⁴	.15 ⁴	.15 ⁴		
Poultry, per mature bird	Corn, grain, lbs.	70	40	40	Eggs, doz.	10
	Corn, ground, lbs.		7	10	Fryers, lbs.	2
	Bran, lbs.		10	15	Hens, lbs.	3½
	Shorts, lbs.		10	15		
	Tankage, lbs.		7	10		
	Oyster shell, lbs. (grit)					
	Skim milk, lbs.	4	4	4		
	Baby chick grains, lbs.	150	100			
		2				
	Miscellaneous, dolls.	.01	.01	.01		
Work stock per head	Corn, bus.	35	40	30	Hours of work	600-900
	Mixed hay, lbs.	4000	3000	4000		
	Pasture, acres	1.5	1.5	1.5		
	Corn stover, lbs.		1000	1000		
	Miscellaneous, dolls.	2.00	2.00	2.00		

¹ Only one of these feed combinations is used at a given time, the particular combination depending upon the kind of feed grown and the prices of different feeds.

² In each system enough dairy heifers are included to keep up the herd. For each dairy heifer kept, a cull cow weighing 700 lbs. would be sold. The average weight of the cull cows sold would probably be between 750 and 800 lbs., the difference being deducted because of death losses.

³ Beef cows to be culled out and sold at about 7 years of age, weighing 1000 lbs. with 20% death losses. Enough heifers are kept to replace old cows culled out. Beef calves to be sold at about 8 months of age, weight about 550 lbs. With one-fifth out for replacement and 7% death losses leaves a 410-pound calf for sale.

⁴ If pigs are bought at weaning time, 5 cents per cwt.

experiment field results and upon data obtained from detailed cost studies on farms handled under similar farming conditions. It is not expected that these requirements and yields will prevail for any one year, however, over a period of years with reasonably good cultural practices these results may be equaled or surpassed.

The feed, pasture and miscellaneous requirements needed in the production of livestock and livestock products along with the production which may normally be expected to result are shown in Table 15. These figures are largely based upon results obtained on farms in Grayson County.

Assumed relative prices for products to be sold and items to be bought in the process of running the farm are shown in Table 16. These assumed relative prices are not intended as price predictions. They are presented primarily to emphasize the necessity for assigning values to the items to be bought and products to be sold in deciding upon the possibilities of an enterprise. While these prices have been determined after a careful study of the prices that have prevailed in the section in recent years it will be necessary at any given time for farmers to make their own assumptions as to the prices that will be applicable to conditions on their own farms.

Suggested System No. 1

This suggested system is for an 80-acre farm with 48 acres of tillable land in rotation, eight acres of rough cleared land which is only suitable for permanent pasture, and with the balance, 24 acres, in woodland, farmstead, garden, orchard, and waste land. This system provides for a six year rotation with eight-acre fields occupied as follows:

First year	Corn (6 acres), Tobacco (2 acres).
Second year	Corn (5 acres), Soybean hay (3 acres).
Third year	Wheat (8 acres) seeded to mixed clover and grass
Fourth year	Mixed clover hay* (8 acres).
Fifth year	Rotation pasture (8 acres).
Sixth year	Rotation pasture (8 acres).

* If it is not practicable to get limestone or marl, Korean lespedeza may be used in the place of mixed clover and alfalfa for hay. Korean lespedeza can be grown on acid soil without the use of limestone. The lespedeza hay can be substituted, pound for pound, for the mixed clover hay in the feed combinations. The seeding mixture will cost approximately the same as the clover mixture shown in the budget, Table 17. There has not been enough lespedeza cut for hay to tell what yield can be expected over a period of years but it probably would not be greatly different from that given for mixed clover hay. The net return from the adjusted system would, therefore, not be greatly different from that shown in the budget if the fertility of the soil and crop yields can be maintained equally well.

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TABLE 16. Assumed Relative Prices for Products to be Sold and Expense Items to be Incurred.

Products to be Sold		Expense Items	
Item	Price	Item	Price
Cash crops:	Dolls.	Feeds:	Dolls.
Wheat, per bu.	1.00	Bran, per 100 lbs.	1.65
Tobacco, per lb.	.16	Shorts, per 100 lbs.	1.90
Cucumbers for salting, per 100 lbs.	2.25 ¹	Cottonseed meal, per 100 lbs.	2.00
Livestock:		Linseed oil meal, per 100 lbs.	2.75
Whole milk, grade B, per 100 lbs. net	2.25	Tankage, per 100 lbs.	3.50
Butterfat, per lb.	.35	Oyster shell, per 100 lbs.	1.00
Veal, dairy, per lb.	.08	Baby chick grains, per 100 lbs.	3.00
Veal, beef, per lb.	.09	Oats, per bu.	.50
Calf, beef, per lb.	.10	Fertilizer:	
Cull cows, dairy, per lb.	.03	Superphosphate, per 100 lbs.	1.00
Cull cows, beef, per lb.	.05	Raw bone meal, per 100 lbs.	1.75
Lambs, per lb.	.10	Nitrate of soda, per 100 lbs.	3.00
Wool, per lb.	.30	Seeds and Plants:	
Cull ewes, per lb.	.04	Soybeans, Haberlandt, per bu.	2.50
Hogs, per 100 lbs.	9.00	Lespedeza (common), per lb.	.14
Eggs, per doz.	.25	Red clover, per lb.	.30
Fryers, per lb.	.24	Alsike clover, per lb.	.30
Hens, per lb.	.20	Alfalfa, per lb.	.25
		Sweet clover, unhulled, per lb.	.08
		Orchard grass, per lb.	.18
		Redtop, per lb.	.20
		Rye, per bu.	1.00
		Oats, per bu.	.60
		Cucumber seed, per lb.	.75
		Miscellaneous:	
		Twine, per lb.	.16
		Canvas, per yd.	.03½
		Arsenate of lead, per lb.	.35
		Cucumber dust, per lb.	.10
		Threshing wheat, per bu.	.10
		Threshing oats, per bu.	.05
		Baling hay, per ton	2.40
		Limestone, ² per ton	1.50

¹ Assuming 60% Vat Run at \$3.00; 20% Large, at \$1.50; and 20% Nubbs at \$.70.

² Cost at unloading points in county. Where marl is available the only costs are for farm labor and machinery, hauling and spreading.

A detailed budget for this system is shown in Table 17. The data shown in Tables 14, 15, and 16 have been used in the preparation of this budget. For example, the amounts of fertilizer and other materials used in the production of the two acres of tobacco were obtained by multiplying the requirements for an acre of tobacco given in Table 14 by two. Similarly the

total requirements for the eight dairy cows were obtained by multiplying the feed, pasture, etc., given in one of the combinations in Table 15, by eight.

TABLE 17. Budget of Suggested System for 80-Acre Farm.

Section A. Crops: Acres, Production and Disposition.

Crop	Acres	Production	Farm Use		Sales		
			Seed	Feed	Amount	Price	Value
Tobacco	2	2000 lbs.			2000 lbs.	16c	\$320
Corn: Grain	11	440 bus.	1½ bus.	438½ bus.			
Stover	11	24200 lbs.		24200 lbs.			
Wheat	8	128 bus.	10 bus.		118 bus.	\$1.00	118
Soybean hay	3	12000 lbs.		12000 lbs.			
Mixed clover hay	8	24000 lbs.		24000 lbs.			
Rye	8	Cover crop					
Rotation pasture	16	Pasture					
Permanent pasture	8	Pasture					
Total							\$438

Section B. Crops Requirements: Seed, Fertilizer, and Other Materials.

Crop	Acres	Seeds			Fertilizer and Other Materials		
		Kind	Amount	Value	Kind	Amount	Value
Tobacco	2			Farm	Nitrate of soda	400 lbs.	\$12
					Superphosphate 16%	1000 lbs.	10
					Canvas	33 yds.	1
					Arsenate of lead	8 lbs.	3
Corn	11	Corn	1½ bus.	Farm	Superphosphate 16%	2200 lbs.	22
					Twine	11 lbs.	2
Rye	8	Rye	12 bus.	12			
Wheat	8	Wheat	10 bus.	Farm	Twine	24 lbs.	4
					Superphosphate 16%	2400 lbs.	24
Soybean hay	3	Haberlandts	6 bus.	15	Threshing	128 bus.	13
		Red clover	32 lbs.	10			
		Alfalfa	32 lbs.	8			
Mixed clover hay	8	Orchard grass	40 lbs.	7	Limestone	16 tons	24
		Lespedeza	24 lbs.	3			
		Lespedeza	6 lbs.	1			
Pasture mixture	2	Orchard grass	14 lbs.	3			
		Redtop	6 lbs.	1	Limestone	4 tons	6
		Sweet clover	20 lbs.	2			
Totals				\$62			\$121

Limestone is applied at the rate of two tons per acre once in each round of the rotation. Usually it should be applied at the time of seeding small grain in the fall prior to seeding the mixed clovers in the spring. Wherever marl is available, it can

Section C. Livestock: Estimated Feed, Pasture and Other Expense Items Required Per Year.

Livestock	No.	Home Grown Feeds		Pasture Acres	Purchased Feed and Other Expenses		
		Kind	Amount		Kind	Amount	Value
Dairy cows	8	Corn	112 bus.	16	Bran	3200 lbs.	\$53
		Legume hay	20000 lbs.		Cottonseed meal	1600 lbs.	32
		Corn stover	16000 lbs.		Misc. expenses		16
Dairy heifers	3	Corn	12 bus.	4½	Bran	300 lbs.	5
		Legume hay	3000 lbs.		Misc. expenses		1
		Corn stover	3000 lbs.				
Dairy calves	3	Whole milk	150 lbs.	1½			
		Skim-milk	3600 lbs.				
		Legume hay	600 lbs.				
Veals	4	Whole milk	2000 lbs.				
Pigs	4	Corn	52 bus.	1	Pigs bought, 4	200 lbs.	20
		Skim-milk	2200 lbs.				
Poultry	130	Corn	162 bus.		Oyster shell	520 lbs.	5
		Skim-milk	19500 lbs.		Baby chick grains	260 lbs.	8
					Misc. expenses		1
Work stock	3	Corn	90 bus.	4½	Misc. expenses	\$2 per head	6
		Legume hay	12000 lbs.		Depreciation	\$7 per head	21
		Corn stover	3000 lbs.				
Totals		Corn	428 bus.	27½	Feeds		\$103
		Legume hay	35600 lbs.		Pigs bought		20
		Corn stover	22000 lbs.		Misc. expenses		24
		Whole milk	2150 lbs.		Work stock depreciation		21
		Skim-milk	25300 lbs.				

be used in the place of ground limestone. When the land has been limed an application of 300 pounds of superphosphate is used on the wheat. A considerable part of this will remain in the soil for the use of the clovers and grasses which follow. An application of 200 pounds of phosphate in the row is then made for the corn and about 500 pounds of superphosphate is used on the tobacco, part in the row and part broadcast, in addition to 200 pounds of nitrate of soda.

A mixture of alfalfa, red clover, orchard grass, and lespedeza is seeded for hay and pasture. Usually the mixture makes a

good crop of hay the first year and then provides pasture the two years following. The permanent pasture fields should be limed and reseeded once every four to eight years.

Section D. Livestock: Estimated Annual Production and Disposition of Products.

Kind of Livestock and Product	Production	Disposition of Products				
		Fed to Livestock	Used in Home		Sales	
			Amount	Value	Amount	Value
Dairy cows			(365 gals.)			
Whole milk	40000 lbs.	2150 lbs.	3150 lbs.	\$63 ¹	1562 lbs. B. F. ²	\$547
Veals	4				560 lbs.	45
Cull cows	2				1100 lbs.	42
Heifers	1				1 heifer	40
Pork	1000 lbs.		500 lbs.	45	500 lbs.	45
Poultry, eggs	1300 doz.	30 doz. set	150 doz.	38	1120 doz.	280
Fryers	260 lbs.		60 lbs.	14	200 lbs.	48
Hens	455 lbs.		30 lbs.	6	425 lbs.	85
Totals				\$166		\$1132

¹ Figured as 142 lbs. butterfat @ 35 cents and 325 gallons skim-milk @ 4 cents.

² Produced from 34,700 lbs. of 4½% milk, leaving 30,795 lbs. of skim-milk available.

Section E. Summary of Receipts and Expenses.

Income		Expenses	
Crops (Section A)	\$438	Crops (Section B)	
Livestock and livestock products (Section D)	1132	Seeds	\$62
Livestock products used in home (Section D)	166	Fertilizer and other expenses	121
Garden and truck	150	Livestock (Section C)	
Total	\$1886	Feeds purchased	103
		Pigs bought	20
		Miscellaneous expenses	24
		Work stock depreciation	21
		Building expense	73
		Equipment expense	62
		Fence expense	44
Net return to labor, management and capital	\$1244	General farm ¹	112
		Total	\$642

¹ Includes telephone \$6, auto \$50, insurance \$16, and taxes \$40.

The expected net return from this system is approximately \$1,244. It provides three important sources of income, dairy cows, tobacco, and poultry, and two minor sources, wheat and hogs. It is particularly adapted to small family farms with a limited acreage of tillable land and a relatively large supply of available labor. Such a system will afford profitable employ-

ment for the manager, and family labor equivalent to one-half to three-fourths of a man for a year.

If limestone and phosphate are applied and good use is made of all manures the rotation is such as will enable the operator to easily maintain or even increase the fertility of the soil. All of the products are of such a nature that they can be hauled a comparatively long distance to market.

Rye or oats can be substituted readily for wheat in the rotation and where machinery is not available for harvesting wheat these crops may be grown for hay or pasture to good advantage. If oats are grown for grain it will be possible to handle more livestock and thus keep the total net returns up to the figure mentioned above.

If for some reason it is not desirable to grow as much as two acres of tobacco, some other cash crop may be substituted for a part or all of the tobacco. In some sections of the county a market is available for cucumbers and this crop will fit in well with the rotation outlined. It is comparatively easy to figure the results which might be expected from substituting an acre of cucumbers, for instance, for one acre of the tobacco. According to Tables 14 and 15 the total cash expenses for the acre of cucumbers would be only about \$11.45 as compared with \$12.35 for the tobacco but the total receipts from the acre of cucumbers would be about \$112.50 as compared with \$160.00 for the tobacco, leaving a net balance in favor of the system with two acres of tobacco \$46.60. However, we should take into consideration the fact that the cucumbers will not require as much labor per acre and the peak loads of labor will occur at different times of the year. In addition, no barn room is required for cucumbers and the income is available in the summer and early fall. There are also other minor advantages and disadvantages which cannot be accurately measured in monetary terms.

Suggested System No. 2

(A 150-Acre Farm)

A detailed budget for suggested system No. 2 is presented in Table 18. The data shown in Tables 14, 15 and 16 have been

used in making calculations for this budget. The system is set up for a 150-acre Grayson County farm with 90 acres of tillable land in rotation, 10 acres of permanent pasture, and the balance in woodland, farmstead, and waste land.

The system provides for a five-year rotation with fields of approximately 18 acres. The fields will be occupied as follows:

First year Corn (16 acres) and tobacco (2 acres).

Second year Wheat (18 acres) seeded to mixed clover and grass

Third year Mixed clover hay* (18 acres).

Fourth year Rotation pasture (18 acres).

Fifth year Rotation pasture (18 acres).

TABLE 18. Budget of Suggested System for 150-Acre Farm.

Section A. Crops: Acres, Production, and Disposition.

Crop	Acres	Production	Farm Use		Sales	
			Seed	Feed	Amount	Value
Tobacco	2	2000 lbs.			2000 lbs.	\$320
Corn: Grain	16	640 bus.	2	638 bus.		
Stover	16	35200 lbs.		35200 lbs.		
Wheat	18	288 bus.	22½ bus.		265 bus.	265
Mixed clover hay	18	54000 lbs.		54000 lbs.		
Rotation pasture	36	Pasture				
Permanent pasture	10	Pasture				
Total						\$585

Section B. Crop Requirements: Seed, Fertilizer, and Other Materials.

Crop	Acres	Seeds			Fertilizer and Other Materials		
		Kind	Amount	Value	Kind	Amount	Value
Tobacco	2				Nitrate of soda	400 lbs.	\$12
					Superphosphate 16%	1000 lbs.	10
					Canvas	33 yds.	1
					Arsenate of lead	8 lbs.	3
Corn	16	Corn	2 bus.	Farm	Superphosphate 16%	3200 lbs.	32
					Twine	16 lbs.	3
Wheat	18	Wheat	22½ bus.	Farm	Superphosphate 16	4800 lbs.	48
					Twine	54 lbs.	9
					Threshing	288 bus.	29
Mixed clover hay	18	Red clover	72 lbs.	22			
		Alfalfa	72 lbs.	18			
		Orchard grass	90 lbs.	16	Limestone	36 tons	54
		Lespedeza	54 lbs.	3			
Pasture mixture	2	Lespedeza	6 lbs.	1			
		Orchard grass	14 lbs.	3	Limestone	4 tons	6
		Redtop	6 lbs.	1			
		Sweet clover	20 lbs.	2			
Totals				\$71			\$207

* See footnote page 196.

An application of about two tons of limestone per acre is provided for each complete round of the rotation and a total of about 500 pounds of superphosphate is applied in each round of the rotation, 100 pounds for each year of the rotation. The superphosphate is applied, 200 pounds with the corn, in the row, and 300 pounds with the small grain.

The expected net return from this system is approximately \$1,830. It provides for two important sources of income, dairy cows and poultry, and four minor sources of income, tobacco, wheat, sheep and hogs. A system similar to this will be found adaptable to almost any section of the county. The enterprises are well selected so that profitable employment for man labor will be available throughout the year. Good use is also made of the land, machinery and horse power available. The

Section C. Livestock: Estimated Feed, Pasture and Other Expense Items Required Per Year.

Livestock	No.	Home Grown Feeds		Pasture Acres	Purchased Feed and Other Expenses		
		Kind	Amount		Kind	Amount	Value
Dairy cows	10	Corn	170 bus.	20	Bran	1000 lbs.	\$16
		Legume hay	25000 lbs.		Cottonseed meal	2500 lbs.	50
		Corn stover	20000 lbs.		Misc. expenses	\$2 per head	20
Dairy heifers	3	Corn	12 bus.	4½	Bran	300 lbs.	5
		Legume hay	3000 lbs.		Misc. expenses		1
		Corn stover	3000 lbs.				
Dairy calves	3	Whole milk	150 lbs.	1½			
		Skim milk	3600 lbs.				
		Legume hay	60 lbs.				
Veals	6	Whole milk	3000 lbs.				
Sheep		Corn	45 bus.	12	Linseed meal	75 lbs.	2
		Legume hay	9750 lbs.		Misc. expenses		1
Sow with 8 pigs, lbs.	1 (1600)	Corn	104 bus.	1½	Misc. expenses		2
		Skim milk	4400 lbs.				
Poultry	150	Corn	187 bus.		Oyster shell	600 lbs.	6
		Skim milk	22500 lbs.		Baby chick grains	300 lbs.	9
					Misc. expenses		2
Work stock	4	Corn	120 bus.		Misc. expenses	\$2 per head	8
		Legume hay	16000 lbs.		Depreciation	\$7 per head	28
		Corn stover	4000 lbs.				
Totals		Corn	638 bus.	45½	Feeds		88
		Legume hay	54350 lbs.		Misc. expenses		34
		Corn stover	27000 lbs.		Work stock depreciation		28
		Whole milk	3150 lbs.				
		Skim milk	30500 lbs.				

products produced for sale are such that they may be marketed advantageously from the outlying sections of the county. One man with the help of about two boys or one hired man during the crop season could provide all the labor required by the system.

Adjusting the System to Include Beef Cattle Instead of Dairy Cattle

If for some reason dairy cows do not fit the particular farm, beef cattle can be substituted very conveniently. About eleven

Section D. Livestock: Estimated Annual Production and Disposition of Products.

Kind of Livestock and Product	Production	Disposition of Products				
		Fed to Livestock	Used in Home		Sales	
			Amount	Value	Amount	Value
Dairy cows						
Whole milk	50000 lbs.	3150 lbs.	6000 lbs.	\$119 ¹	1838 lbs. B. F. ²	\$643
Veals	6				6- 840 lbs.	67
Cull cows	3				3-2100 lbs.	63
Sheep, wool	210 lbs.				210 lbs.	63
Lambs	2400 lbs.				2400 lbs.	240
Cull ewes	450 lbs.				450 lbs.	18
Pork	1600 lbs.		800 lbs.	72	800 lbs.	72
Poultry, eggs	1500 doz.	35 doz. set	200 doz.	50	1265 doz.	316
Fryers	300 lbs.		80 lbs.	19	220 lbs.	53
Hens	525 lbs.		40 lbs.	8	485 lbs.	97
Totals				\$268		\$1632

¹ Figured as 270 lbs. of butterfat @ 35 cents and 620 gallons skim milk @ 4 cents.

² Produced from 40,850 lbs. of 4½% milk, leaving 36,250 lbs. of skim milk available.

Section E. Summary of Receipts and Expenses.

Income		Expenses	
Crops (Section A)	\$585	Crops (Section B)	
Livestock and livestock products (Section D)	1632	Seeds	\$71
Livestock products used in home (Section D)	268	Fertilizer and other materials	207
Garden and truck	200	Livestock (Section C)	
		Feeds purchased	88
		Miscellaneous expenses	34
		Work stock depreciation	28
Total	\$2685	Building expense	125
		Equipment expense	88
		Fence expense	68
		General farm ¹	146
Net return to labor, management and capital	\$1830	Total	\$855

¹ Includes telephone \$6, auto \$60, insurance \$20, and taxes \$60.

beef cows could be kept with the same amount of home grown feed and pasture as the ten dairy cows in this system. Less labor would be required for the system with beef cattle but there would be a very small amount of skim milk available for the hogs and poultry and it would be necessary to buy protein supplements in the form of tankage, meat scrap, bran, and shorts. This would result in a larger cash outlay for purchased feeds in the system with beef cattle.

If there is enough labor available on the farm to milk and care for the dairy cows, the farm could normally be expected to return approximately \$211 more net profit per year with a system built around dairy cows as the principal source of income than with a system built around beef cattle.

As will be noted from Section D of Table 18 the normal expected return from dairy cattle in the system is \$773. While the normal expected return from eleven beef cows is only \$661, making \$112 more receipts from the system with dairy cattle. In addition, the expected normal feed and miscellaneous expenses are only \$150 for the system with dairy cattle (see Section C, Table 18) as against \$249 for the system with beef cattle. This is \$99 less expense, for the system with dairy cattle, which gives a total advantage of \$211 for this system.

If, however, there is not sufficient labor available to take care of the dairy cows along with the other farm work and additional labor must be hired during the summer season when wages are high, it is possible that the system with beef cattle would prove more profitable.

Suggested System No. 3

A detailed budget for suggested system number 3 is presented in Table 19. This system is set up for a 200-acre Grayson County farm with 120 acres of tillable land in rotation, 20 acres of permanent pasture, and the balance, 60 acres, in woodland, farmstead, and waste land. It is intended that this system shall be suggestive of a type of organization which is adaptable to the larger farms of this and adjoining counties.

The system provides for a five year rotation with the

tillable land divided into five 24-acre fields. For one round of the rotation any given field would be occupied as follows:

First year Corn for grain and stover.
 Second year Small grain, seeded to mixed clover and grasses.
 Third year Mixed clover hay.
 Fourth year Rotation pasture.
 Fifth year Rotation pasture.

Applications of limestone and phosphate are provided for in this system. With the application of limestone and phos-

TABLE 19. Budget of Suggested System for 200-Acre Farm.

Section A. Crops: Acres, Production and Disposition.

Crop	Acres	Production	Farm Use		Sales		
			Seed	Feed	Amount	Price	Value
Corn: Grain	24	960	3	957			
Stover	24	52800		52800			
Wheat	24	384	30		354		\$354
Mixed clover hay	24	72000		72000			
Rotation pasture	48	Pasture					
Permanent pasture	20	Pasture					
Total							\$354

Section B. Crops Requirements: Seed, Fertilizer, and Other Materials.

Crop	Acres	Seeds			Fertilizer and Other Materials		
		Kind	Amount	Value	Kind	Amount	Value
Corn	24	Corn	3	Farm	Superphosphate 16% Twine	4800 lbs. 24 lbs.	\$48 4
Wheat	24	Wheat	30	Farm	Superphosphate 16% Twine Threshing	7200 lbs. 72 lbs. 384 bus.	72 12 33
Mixed clover hay	24	Red clover Alfalfa Orchard grass Lespedeza	96 96 120 72	29 24 22 10	Limestone	48 tons	72
Permanent pasture seeding	3	Lespedeza Orchard grass Redtop Sweet clover	9 21 9 30	1 4 2 2	Limestone	6 tons	9
Totals				\$94			\$255

Farm Organization and Management in Grayson Co. 207

Section C. Livestock: Estimated Feed, Pasture and Other Expense Items Required Per Year.

Livestock	No.	Home Grown Feeds		Pasture Acres	Purchased Feed and Other Expenses		
		Kind	Amount		Kind	Amount	Value
Beef cows	15	Corn Legume hay Corn stover	270 bus. 33000 lbs. 45000 lbs.	30	Cottonseed meal Misc. expenses	2625 lbs.	\$52 8
Beef heifers	3	Corn Legume hay Corn stover	12 bus. 4500 lbs. 3000 lbs.	4½	Misc. expenses		1
Bulls	1	Corn Legume hay	16 bus. 4000 lbs.	2½	Misc. expenses		1
Sheep	40	Corn Legume hay	60 bus. 13000 lbs.	16	Linseed meal Misc. expenses	100 lbs.	3 1
Sows with 8 pigs, lbs.	2 (3200)	Corn	224 bus.	3	Tankage Misc. expenses	640 lbs.	22 5
Poultry	240	Corn Skim milk	214 bus. 12000 lbs.		Bran Shorts Tankage Oyster shell Misc. expenses	3000 lbs. 3000 lbs. 2100 lbs. 960 lbs.	50 57 74 10 2
Work stock	5	Corn Legume hay Corn stover	150 bus. 20000 lbs. 5000 lbs.	7½	Misc. expenses Depreciation	\$2 per head \$7 per head	10 35
Totals		Corn Skim milk Legume hay Corn stover	946 bus. 12000 lbs. 74500 lbs. 53000 lbs.	63½	Feeds Misc. expenses Work stock depreciation		\$268 28 35

Section D. Livestock: Estimated Annual Production and Disposition of Products.

Kind of Livestock and Product	Total Production	Disposition of Products				
		Fed to Livestock	Used in Home		Sales	
			Amount	Value	Amount	Value
Beef cows						
Butterfat	750 lbs.	1	200 lbs.	\$70	550 lbs.	\$192
Skim milk	15000 lbs.	12000 lbs.	300 gals.	12		
Cull cows	2400 lbs.				2400 lbs.	120
Calf, beef	6150 lbs.				6150 lbs.	615
Sheep, wool	280 lbs.				280 lbs.	84
Lambs	3200 lbs.				3200 lbs.	320
Cull ewes	600 lbs.				600 lbs.	24
Pork	3200 lbs.		800 lbs.	72	2400 lbs.	216
Poultry, eggs	2400 doz.	80 doz. set	200 doz.	50	2120 doz.	530
Fryers	480 lbs.		80 lbs.	19	400 lbs.	96
Hens	840 lbs.		40 lbs.	8	800 lbs.	160
Total				\$231		\$2357

¹Total production is above that consumed by calves. Calves will take about all the milk produced from the time they are born until they are sold.

phate and good use of the manure in the rotation outlined it is believed that crop yields equal to or better than those indicated should be obtained. Enough livestock is provided to utilize the feed crops produced and enough feed crops are produced to provide homegrown rations for the livestock.

The expected net return from this system is approximately \$2,100. It provides three important sources of income, beef cattle, sheep, and poultry, and two minor sources, wheat and hogs. The enterprises are well diversified and at the same time they are proportioned in such a way that a good volume of business is obtained in each of the three major enterprises.

Section E. Summary of Receipts and Expenses.

Income		Expenses	
Crops (Section A)	\$354	Crops (Section B)	
Livestock and livestock products (Section D)	2357	Seeds	\$94
Livestock products used in home (Section D)	231	Fertilizer and other expenses	255
Garden and truck	250	Livestock (Section C)	
Total	\$3192	Feeds purchased	298
		Miscellaneous expenses	23
		Work stock depreciation	35
		Building expense	80
		Equipment expense	70
		Fence expense	70
Net return to labor, management and capital	2101	General farm ¹	161
		Total	\$1091

¹ Includes telephone \$6, auto \$60, insurance \$20, and taxes \$75.

SUMMARY

This bulletin presents an analysis of the farm business and the sources and uses of income of 233 Grayson County farm families for the year ending March 1, 1929.

The 138 families from whom cost of living records were obtained used food products from their own farms amounting to \$244 each, wood for fuel \$28, valued at farm prices, and house rent \$71, estimated at 10 percent of the inventoried value of the house. Other items averaged \$1 per family. These items, aggregating \$344, are 47 percent of the total value. Work off the farm was a source of income to 35 of the 138 operators and receipts from that source averaged \$205 for the 35 families.

Incomes obtained with little or no effort on the part of the operator averaged \$41 for the 138 families. The total cash expenses for both farm and family on the average were \$12 greater than the total cash income per family.

A detailed business record was obtained from 233 farms. The analysis carried out in this bulletin is confined to the 205 of the farm operators who secured 75 percent or more of their total receipts from the operation of these farms.

Approximately 80 percent of the total farm receipts came from livestock enterprises. Ninety-nine percent of the farms had sales of poultry, 95 percent sold cattle and dairy products, 73 percent sold hogs, 51 percent sold some sheep and wool. Those operators who kept good livestock and especially dairy cows and poultry made larger profits. These enterprises along with the other enterprises permitted a more even distribution of labor thruout the year for the operator and his family.

Corn was the chief feed crop with hay second. Some wheat and oats were grown. Tobacco was the principal cash crop and was grown on 49 farms. Fourteen percent of the total receipts came from crops. Twenty-four percent of the farms reported sales of tobacco, 15 percent hay, 9 percent corn, 12 percent wheat, 28 percent potatoes, 16 percent fruit and 12 percent truck crops.

The average investment of the 205 opeartors was \$4,692 of which 24 percent was working capital. The total receipts averaged \$908 of which \$725 was from livestock and products while \$127 was derived from the sale of crops. Cattle and dairy products led in the amount of receipts with poultry a close second.

The average expenses amounted to \$568 for the 205 farms of which current expenses amounted to \$417, unpaid family labor \$58, decrease in feed \$51, depreciation \$35 and decrease in livestock \$7.

The average labor income was \$105 and when \$332, the value of all perquisites, was added, the average operator's earnings was \$437.

The study indicates that the well being of families in this region is dependent in a large measure upon their producing an ample supply of foods for home use, particularly vegetables, fruits, dairy and poultry products.

To answer the question, "why some farmers make more money than others" several classifications of the farm business records were made. One grouping was that of dividing the records into three groups according to the operator's earnings. This showed on the average that the most successful operators obtained larger crop yields, had livestock which were more productive and used their labor more efficiently. These factors brought out the importance of proper type of farming, volume of sales, a soil improvement program and efficient handling of expenses.

The volume of sales per acre is an important factor in obtaining greater profits. The yield per acre of crops and the unit production of livestock, especially dairy cattle and poultry, had a marked influence on profits.

A soil improvement program, which consists of a good rotation and the use of limestone and phosphate is essential. Since much of the land is hilly and therefore subject to erosion, sod crops and the use of grass-eating livestock are important for profitable farming. The production of good grass and sod crops depends largely upon the application of limestone and phosphate. Sprouts and bushes must be kept out of the pasture if a good stand of any sod is to be had for profitable grazing.

Size of business is an important factor in determining profits. A farm business of adequate size can be attained in either or both of two ways. One way is to increase the amount of business on the present farm by bringing more land into cultivation or by producing more intensive crops, such as tobacco, cucumbers or truck. The other way is to procure more land and enlarge the existing enterprises.

The labor accomplishment per man has a marked influence upon profits. Many of the operators have small farm incomes because their farms provide only a fraction of a full year's productive employment for the operator and his family. The

larger farms more nearly provide full employment. Intensive crops, such as tobacco, and the more intensive livestock such as dairy cows and poultry likewise increase the productive employment available.

Effort has been made to determine the crops and livestock and combinations of crops and livestock most likely to give the highest net returns for the use of the land, labor and funds. Various combinations were set up and calculations made of the net returns reasonably to be expected from such combinations. Three such combinations or budgets are presented in this bulletin.

APPENDIX

TABLE 21. Summary of 205 Grayson County Farms Grouped on Operator's Earnings.

Item	All Farms	Less than \$500	\$500 to \$999	\$1000 and Over
Number of farms	205	133	56	16
Acres per farm	137	126	143	210
Owned	127	119	128	196
Rented	10	7	15	14
Rented out	2	2	2	5
Operated	135	124	141	205
Roads, lots, buildings etc.	5.1	5	6	6.8
Woods pastured	11.3	11	13	8.3
Woods not pastured	20.0	20	16	30.3
Other pasture not tillable	2.1	3	*	4.1
Permanent pasture not tillable	16	15	17	24.4
Rotation pasture	30	25	34	56.8
Idle crop land	6	6	4	6
Crops	44	39	51	68.1
Corn	22.2	19.3	26.6	30.4
Wheat	3.1	2.3	3.9	7.3
Oats for grain	1.5	1.7	1.1	1.9
Rye	*	—	.1	—
Corn silage	.8	.6	.2	4.7
Hay	.7	.5	.8	2.0
Clover	1.2	.2	2.8	1.6
Mixed clover and timothy	8.0	8.1	8.1	10.4
Grass	.3	.4	.4	4
Millet	1.1	1.0	2.0	1.3
Oat hay	2.4	2.1	2.4	5.0
Soybean and cowpea	.3	.4	.2	*
Sorghum for hay	*	*	*	.1
Sorghum for syrup	.3	.3	.5	.9
Tobacco	*	*	*	.1
Potatoes	*	*	*	—
Truck crops	1.1	1.2	1.2	1.4
Orchard	.5	.5	.5	.5
Garden	*	—	.2	—
Other crops	1.4	1.3	1.3	1.8
Man equivalent	32.6	29.8	38.3	38.2
Acres of crops per man	12.9	12.2	14.2	15.8
Acres of crops per horse	177.7	157.3	212.0	250.6
Man work units per man	45.0	40.9	48.9	65.0
Horse work units per horse				
Yields per acre				
Corn	14	11	17	20
Wheat	5	4	6	7
Oats for grain	18	18	15	21
Rye	1.3	3.3	*	—
Hay, all, including oats and sorghum	.8	.8	.9	1.0
Excluding oats and sorghum	.8	.7	.9	1.0
Clover and alfalfa	1.1	1.2	.7	1.6
Mixed clover and timothy	1.0	.9	1.1	.8
Grass	.7	.7	.8	.8
Millet	.8	.6	.9	2.0
Oat hay	.8	.8	.9	1.0
Soybean and cowpea	1.0	.9	1.2	1.0
Sorghum for hay	.8	.7	1.2	2.0
Sorghum for syrup, gals	61	56	111	36
Tobacco, pounds	652	507	685	956
Tobacco, dollars per acre	117	92	124	169

TABLE 21. Summary of 205 Grayson County Farms Grouped on Operator's Earnings—Continued.

Item	All Farms	Less than \$500	\$500 to \$999	\$1000 and Over
Livestock (number beginning of year)				
Horses	1.5	1.5	1.6	1.4
Mules	1.9	1.7	2.0	2.9
Colts, ponies	.1	*	*	.7
Cows	3.4	2.6	4.0	7.3
Heifers over one year old	.6	.4	.6	2.8
Calves under one year old	.9	.7	.9	2.1
Bulls over one year old	.2	.1	.2	.8
Steers over one year old	.7	.4	1.4	1.0
Rams over one year old	.4	.3	.6	.8
Ewes	7.7	5.3	15.9	17.3
Lambs under one year old	*	*	---	---
Boars	*	*	.1	.2
Sows	1.0	.8	1.3	2.4
Other hogs \$10 or more	.4	.3	.6	.1
Pigs less than \$10	3.8	2.5	4.1	13.4
Chickens (mostly hens)	84.7	75.5	90.0	142.0
Turkeys	.9	.5	1.1	3.8
Capital, total	\$4692	\$3909	\$5401	\$8720
Real estate	3563	3054	4046	6092
Land	2221	1834	2622	4015
Dwelling	765	727	790	998
Tenant house	68	55	59	204
Other buildings	509	438	575	875
Livestock	737	549	890	1767
Horses and mules	189	160	221	318
Colts and ponies	5	3	1	42
Cows	215	158	262	524
Other cattle	96	52	125	364
Goats	*	*	---	---
Sheep	89	59	126	203
Hogs	53	37	60	162
Chickens	85	77	90	138
Turkeys	4	2	5	15
Machinery	223	172	249	557
Feed	169	134	216	304
Receipts, total	908	613	1180	2408
Crops	127	75	196	320
Corn	34	18	55	74
Wheat	10	6	18	19
Oats	3	4	2	*
Rye	---	---	---	---
Hay	20	13	40	10
Straw	*	*	---	---
Sorghum syrup	2	1	2	2
Tobacco	49	23	70	198
Potatoes	3	3	3	9
Garden	1	*	2	2
Truck crops	*	1	*	1
Orchard	3	3	3	5
Others	2	3	1	*

TABLE 21. Summary of 205 Grayson County Farms Grouped on Operator's Earnings—Continued.

Item	All Farms	Less than \$500	\$500 to \$999	\$1000 and Over
Livestock and products	\$725	\$497	\$916	\$1957
Horses, mules, colts	7	5	8	28
Cattle	157	93	205	522
Dairy products	153	121	181	322
Sheep	56	34	86	136
Wool	20	13	28	42
Hogs	139	84	194	401
Chickens	71	58	85	128
Eggs	95	77	102	223
Turkeys	27	12	26	155
Honey	*	*	—	—
Wood lot products	9	7	9	19
Rent	3	3	3	—
Increase in feed	23	17	37	29
Work off the farm	21	14	19	83
Expenses, total	568	513	568	1032
Current	417	374	412	784
Hired labor	55	48	46	138
Machinery	9	8	12	16
Dwelling	9	8	9	14
Tenant houses	1	*	.3	4
Other buildings	7	6	9	15
Fences	15	13	17	29
Feed				
Hay, fodder, etc.	20	25	13	3
Concentrates, grain	124	112	128	212
Horseshoeing	5	4	4	8
Veterinary, medicine, etc.	2	1	1	11
Breeding fees	3	2	3	6
Registry fees	*	*	*	—
Seeds, plants, trees	31	25	37	59
Fertilizer	38	33	42	69
Lime	1	1	1	8
Spray material	1	1	*	1
Twine	1	1	1	2
Threshing	4	3	4	6
Baling	4	4	7	2
Other machine work	7	7	4	15
Fuel and oil for farm work	5	4	1	28
Auto for farm use	13	11	11	38
Telephone for farm use	3	3	3	3
Insurance	15	14	13	31
Taxes	43	39	45	66
Rent	1	1	—	—
Other	*	*	1	*
Decrease in livestock	7	8	6	10
Horses, mules, colts	4	4	4	10
Cattle	*	1	—	—
Sheep	*	*	—	—
Hogs	3	3	2	—
Poultry	*	*	—	—
Depreciation	35	30	38	67
Machinery	15	12	16	35
Dwelling	8	7	9	11
Tenant house	1	1	1	1
Other buildings	11	10	12	20
Decrease in feed	51	50	49	73
Unpaid family labor	58	51	63	98

TABLE 21. Summary of 205 Grayson County Farms Grouped on Operator's Earnings—Continued.

Item		All Farms	Less than \$500	\$500 to \$999	\$1000 Over and
Farm income		\$340	\$100	\$612	\$1376
Labor income		105	—95	342	940
Operator's earnings		437	203	715	1407
Family living from farm					
Foods					
Corn		Dolls. 7	7	8	7
Wheat		Dolls. 8	8	9	8
Potatoes		Bus. 6	4	7	15
		Dolls. 8	5	10	20
		Bus. 15	14	17	18
		Dolls. 12	11	12	15
Sorghum syrup		Gals. 2	1	2	3
		Dolls. 2	1	2	2
Fruits and vegetables		Dolls. 58	51	68	79
Butter		Lbs. 94	92	93	118
		Dolls. 28	28	28	35
Cream		Gals. 1	*	2	2
		Dolls. 1	1	2	2
Whole milk		Gals. 170	161	181	208
		Dolls. 27	26	29	33
Skim and buttermilk		Gals. 119	115	126	134
		Dolls. 5	5	5	5
Beef		Lbs. 1	1	—	—
		Dolls. *	*	—	—
Mutton		Lbs. 1	1	3	3
		Dolls. *	*	*	*
Pork		Lbs. 638	540	745	1083
		Dolls. 49	42	58	81
Poultry		No. 31	28	35	47
		Dolls. 17	15	19	26
Eggs		Doz. 78	71	84	121
		Dolls. 20	18	21	30
Honey		Lbs. 1	1	—	—
		Dolls. *	*	—	—
Fire wood		Cords 9	9	10	10
		Dolls. 28	26	31	31
House rent		Dolls. 69	61	79	100
Other		Dolls. *	*	*	—

* Less than one-half of one unit.

